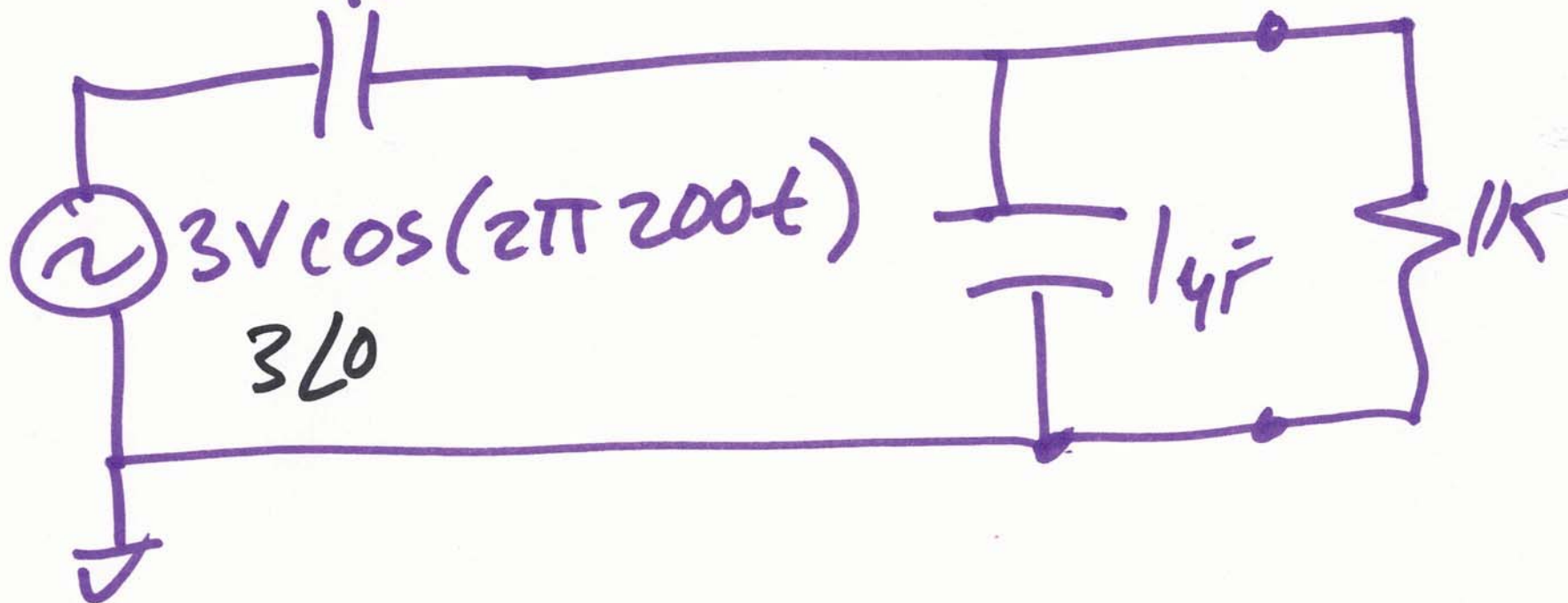


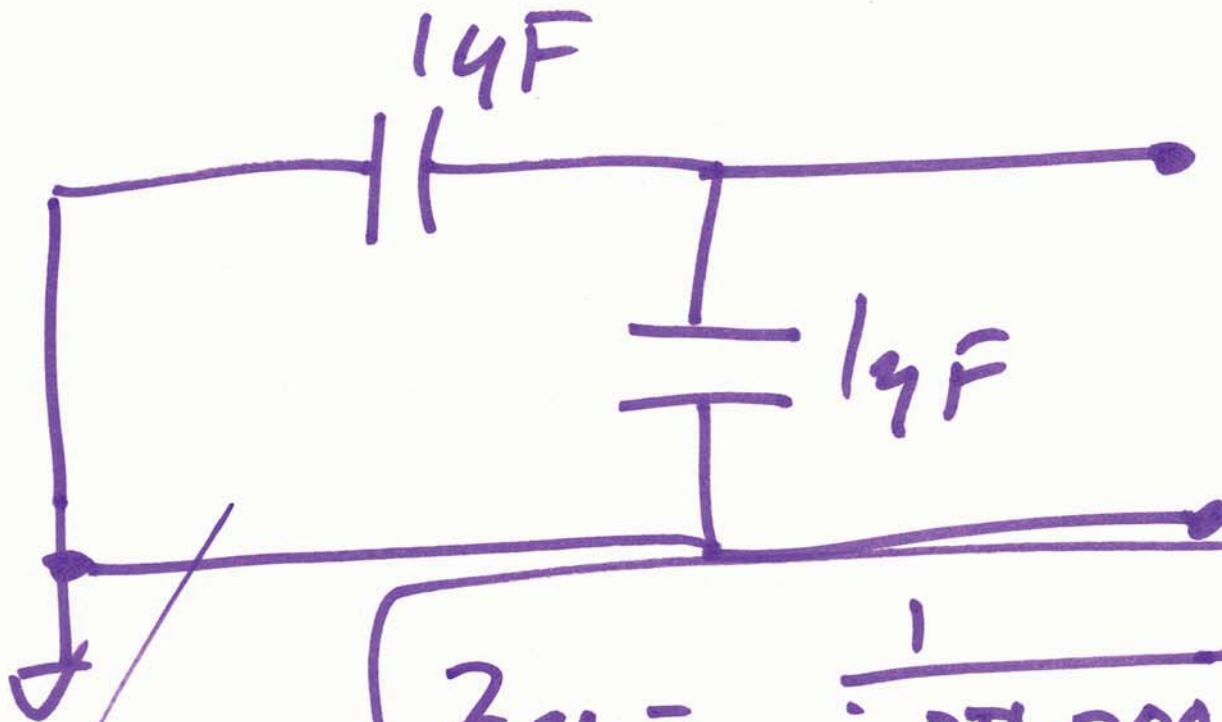
EE221

Circuits II

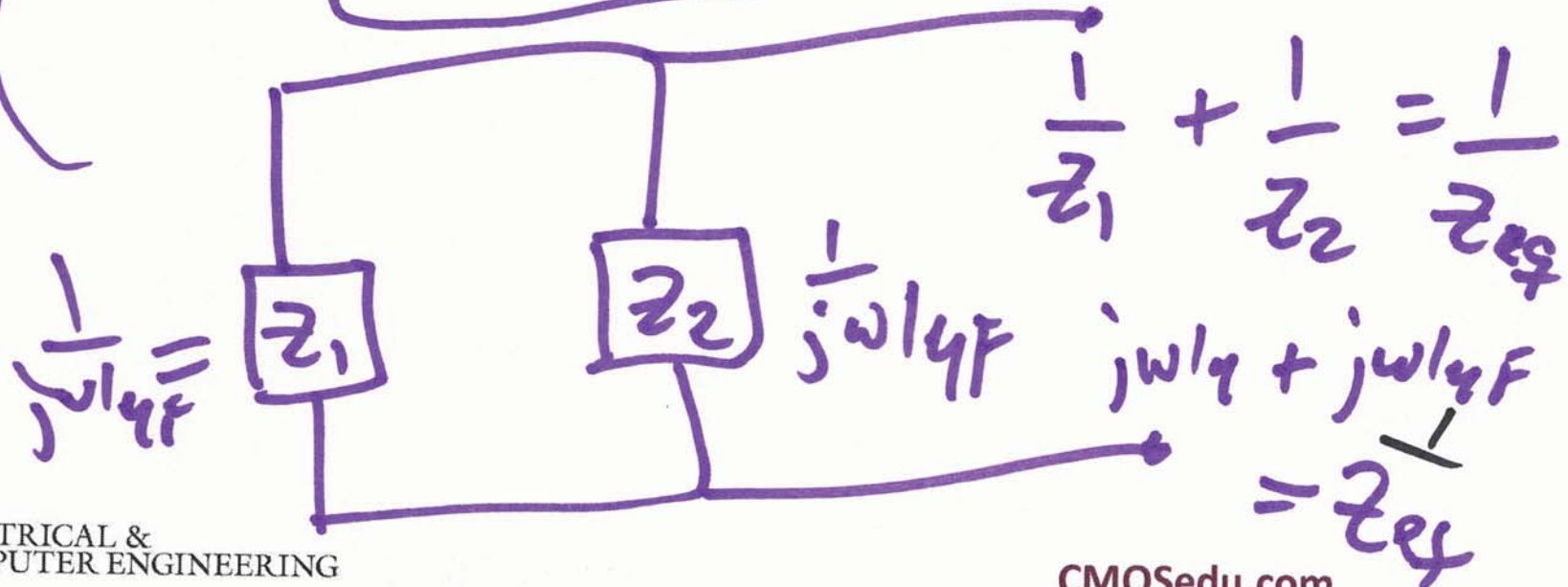
Feb. 5, 2020

14F Lecture 5

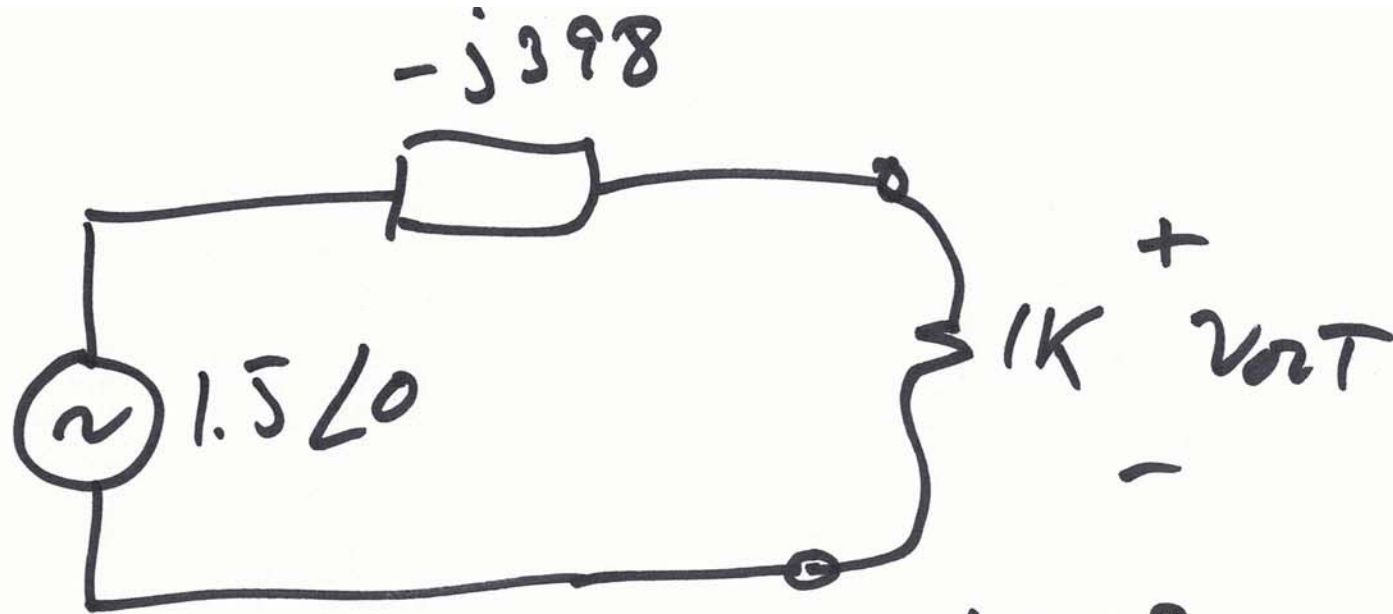




$$Z_{eq} = \frac{1}{j \cdot 2\pi \cdot 200 \cdot 24F}$$



2)



$$\frac{1}{j \cdot 2\pi \cdot 200 \cdot 2\mu F} = -j398$$

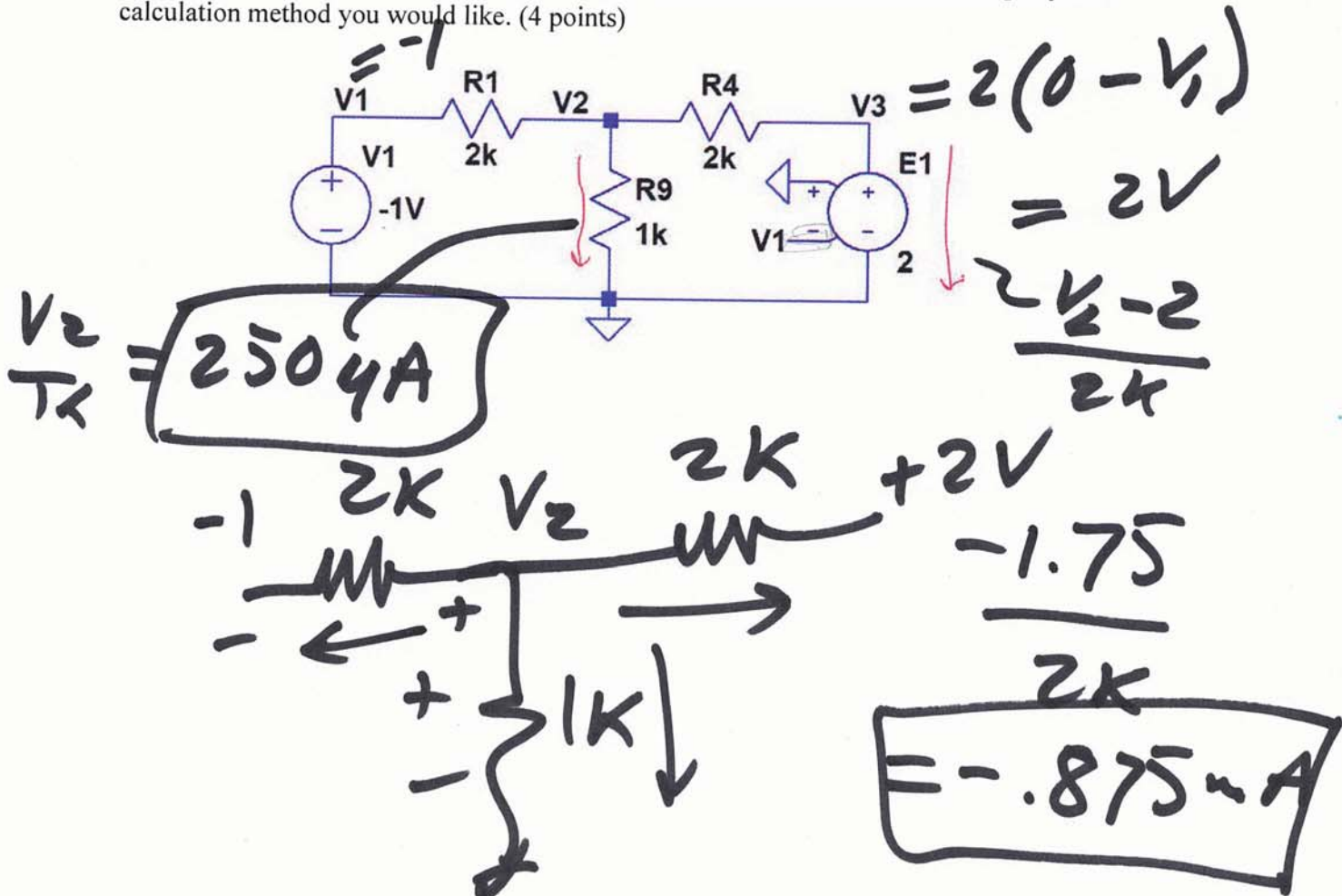
$$v_{ort} = \frac{1.5 \angle 0 \cdot 1k}{1k + j(-398)} = \frac{1,500}{1,076} = 1.39V \angle 0^\circ$$

3)

Closed book and notes.

Show your work for credit and place a box around each of your answers.

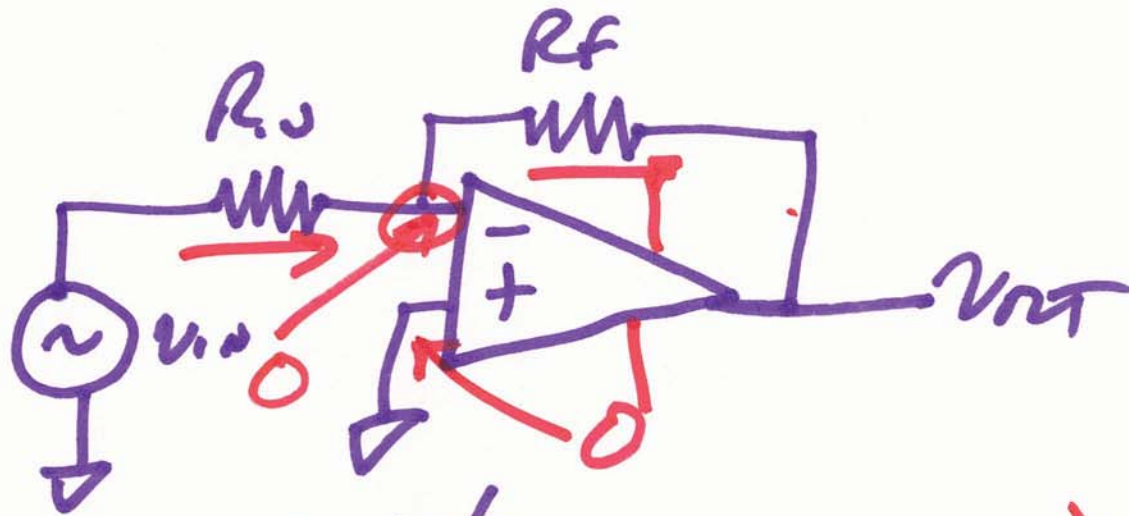
1. In the following circuit find the currents in the directions indicated and V_2 using any hand calculation method you would like. (4 points)



$$0 = \frac{V_2 - (-1)}{2k} + \frac{V_2}{1k} + \frac{V_2 - 2}{2k}$$

$$= V_2 + 1 + 2V_2 + V_2 - 2$$

4) $1 = V_2 \cdot 4, V_2 = 0.25V$



inverting
topology

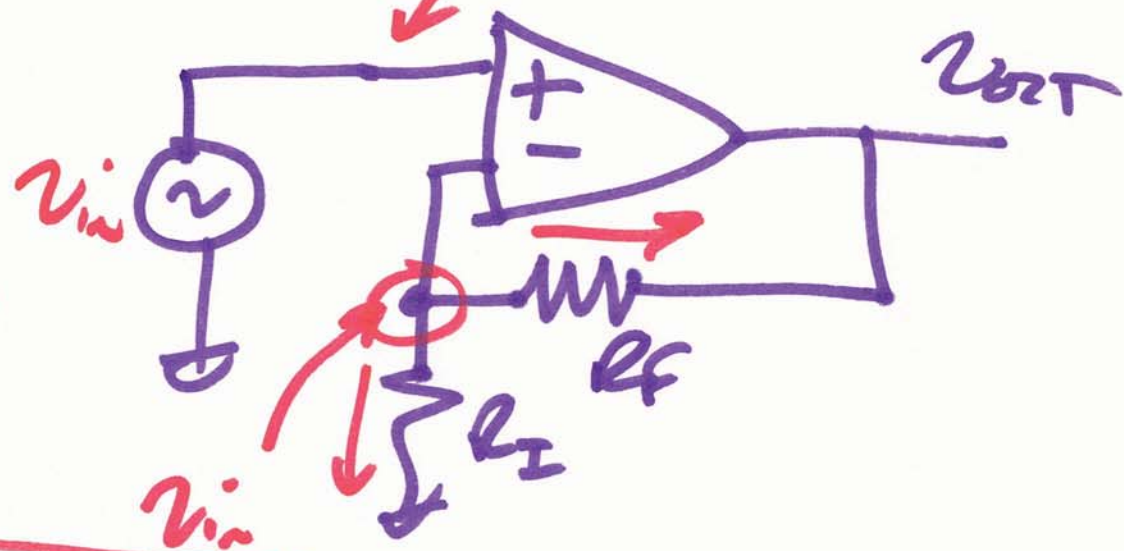
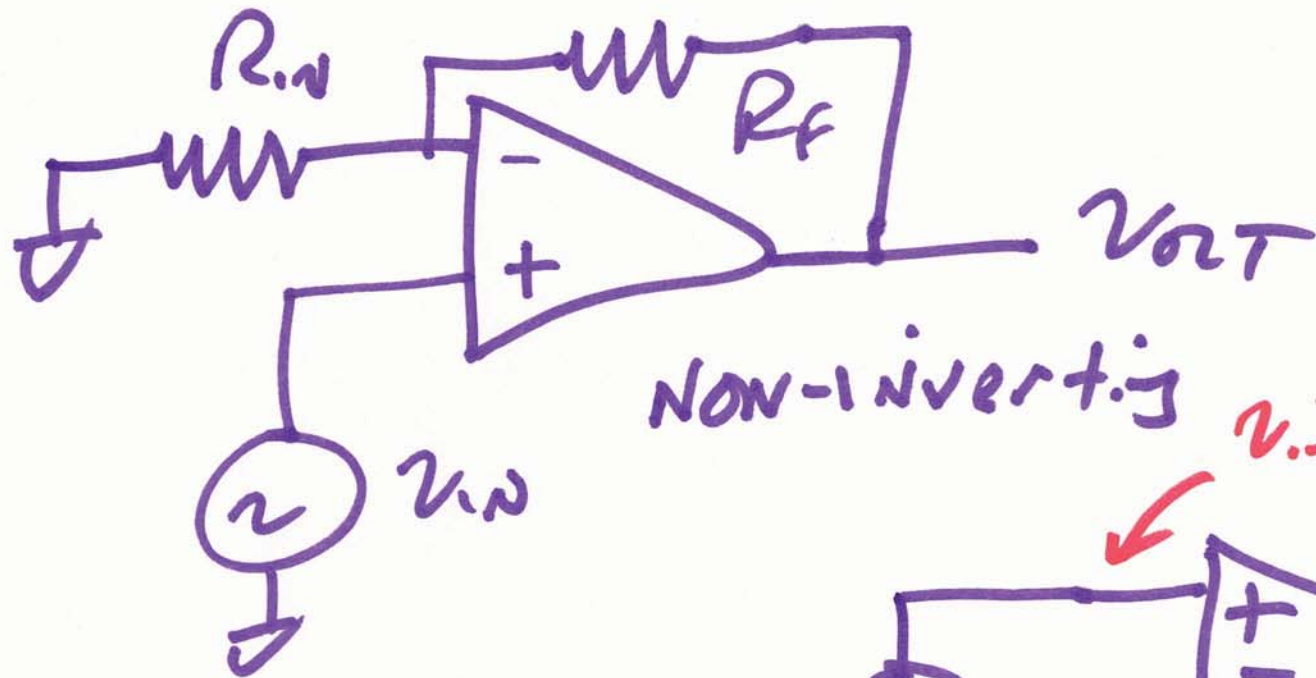


- 1) find voltage at + terminal
- 2) set = to - terminal

$$\frac{v_{in}}{R_{in}} = \frac{0 - v_{out}}{R_f}$$

$$\frac{v_{out}}{v_{in}} = -\frac{R_f}{R_{in}}$$

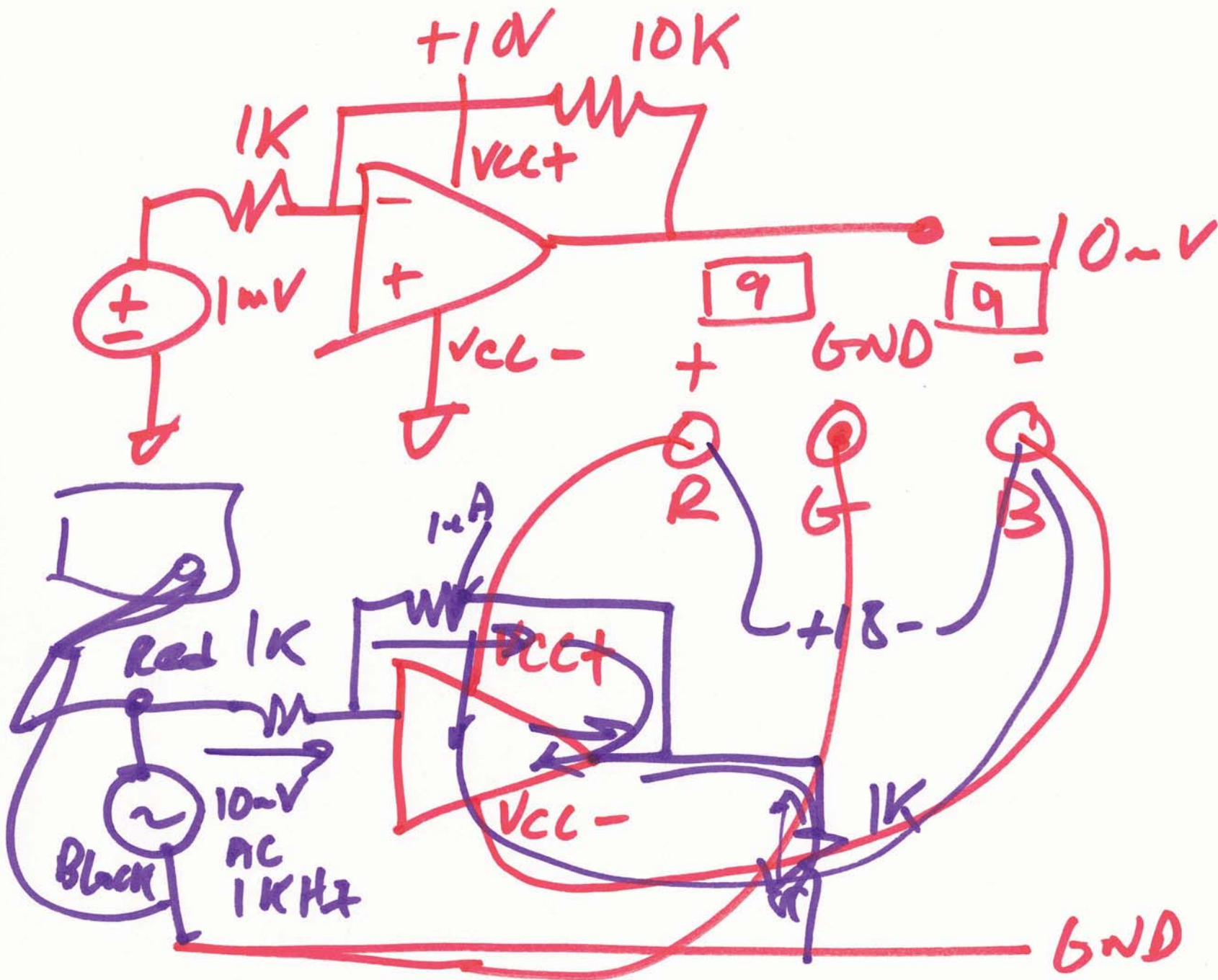
5)



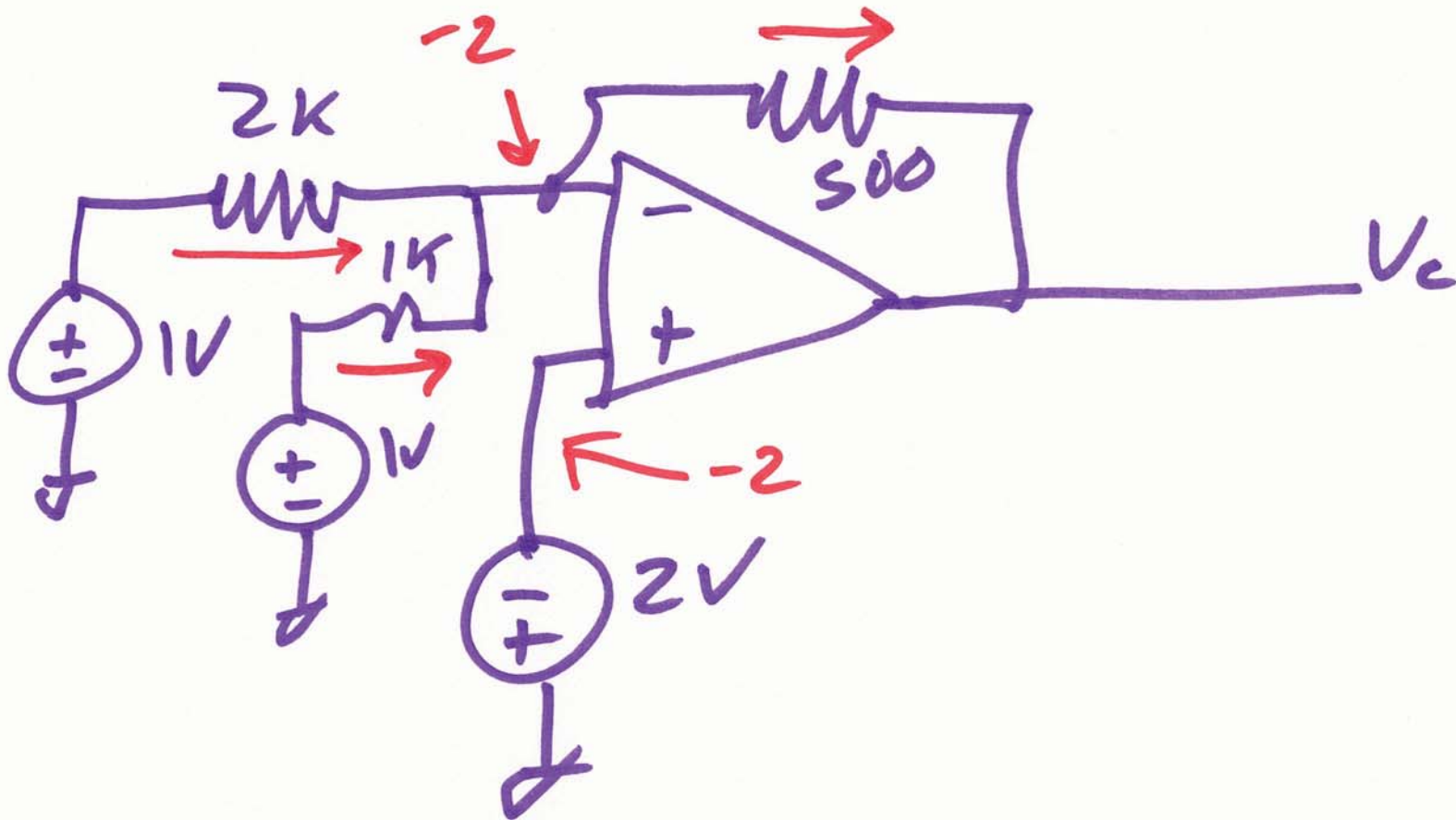
$$\frac{v_{in}}{R_I} + \frac{v_{in} - v_{out}}{R_F} = 0$$

$$\frac{v_{out}}{v_{in}} = 1 + \frac{R_F}{R_I} = \frac{R_I + R_F}{R_I}$$

6)



7)



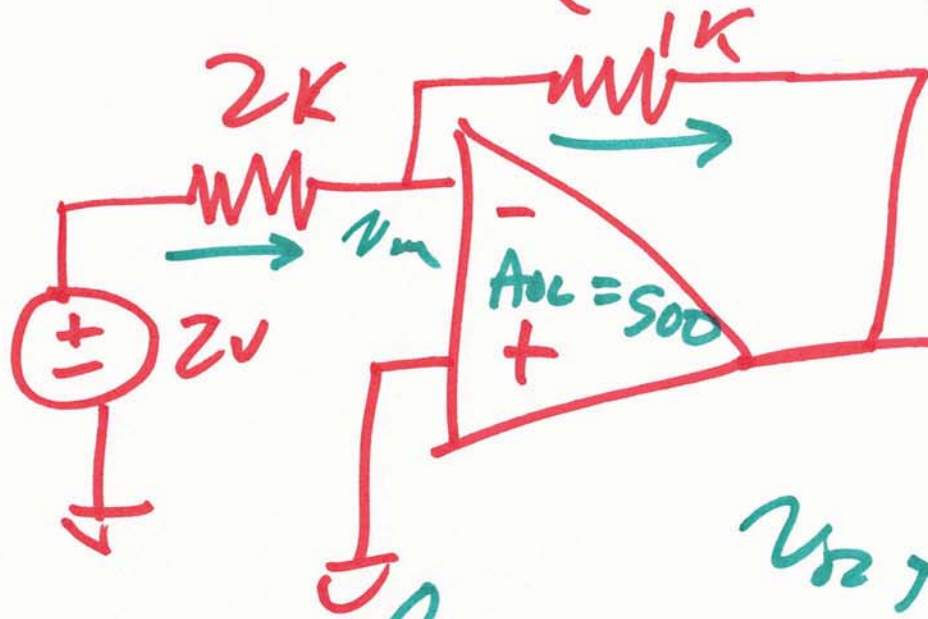
$$\frac{1+2}{2k} + \frac{1+2}{1k} = \frac{-2 - V_c}{\frac{1}{2}k}$$

8)

NON-ideal op-amp

$(A_{OL} \neq \infty) \rightarrow V_p \neq V_m$

$A_{OL} = 500$



$V_{OUT} =$

$500(V_+ - V_-)$

$V_{OUT} = 500(V_p - V_m)$

$V_{OUT} = 500(V_p - V_m) = -500V_m = A_{OL}(V_p - V_m)$

$\frac{2 - V_m}{2k} = \frac{V_m - V_{OUT}}{1k}$

$\infty \rightarrow V_p = V_m = 0$

9)